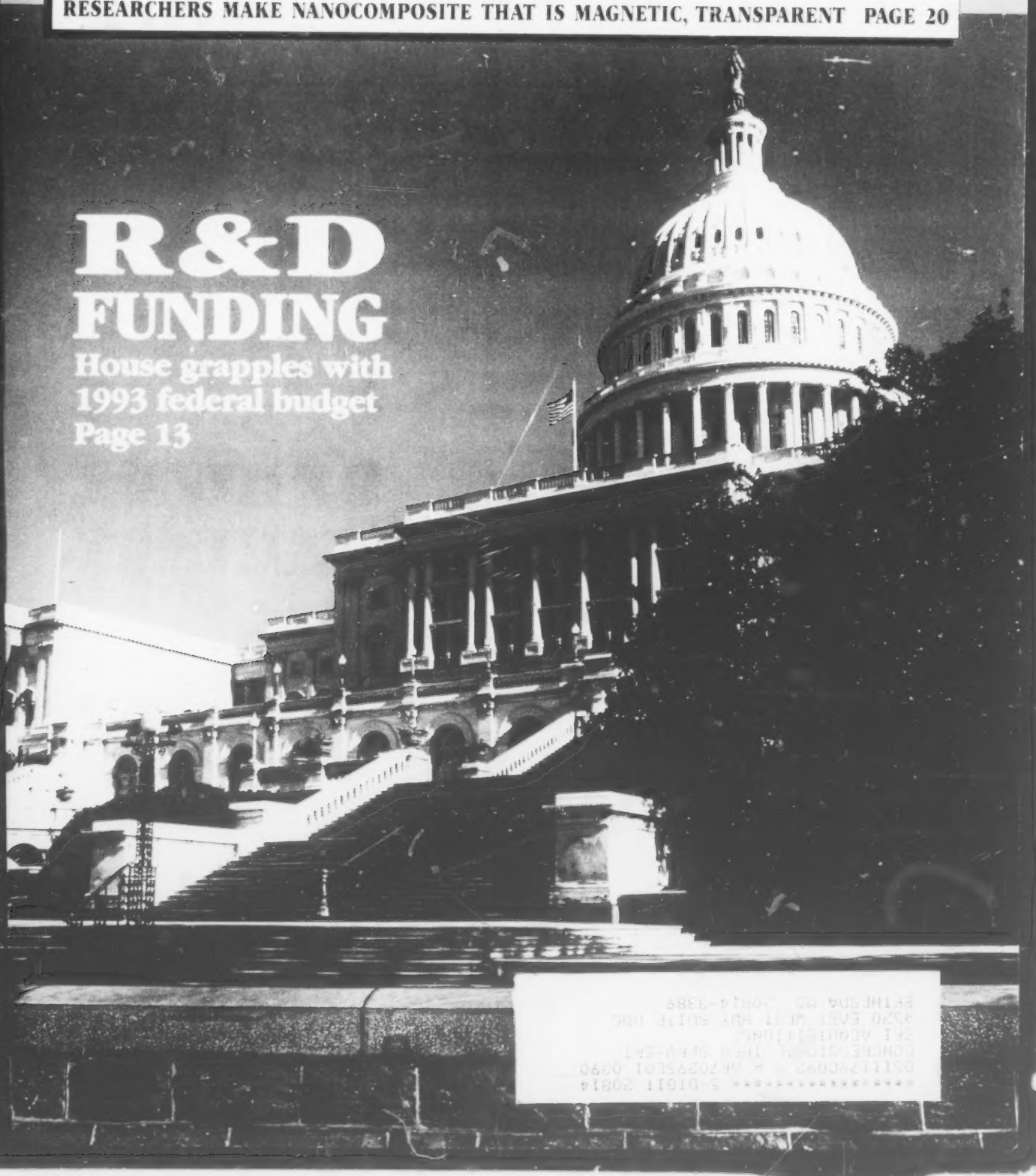
CHEMICAL & ENGINEERING NEWS

C&EN

JULY 20, 1992

RESEARCHERS MAKE NANOCOMPOSITE THAT IS MAGNETIC, TRANSPARENT PAGE 20



R&D FUNDING

House grapples with 1993 federal budget

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CHEMICAL & ENGINEERING NEWS

C&EN

JULY 20, 1992

NEWS OF THE WEEK

■ Simple way to make bulk quantities of microscopic tubular carbon structures, called "carbon nanotubes," has been developed by Japanese researchers. Page 4

■ No criminal charges will be filed in the alleged falsifying of lab work by Thereza Imanishi-Kari to support a paper she coauthored with Nobelist David Baltimore and others in 1986. Page 5

■ Astronauts have completed 14-day microgravity lab mission, successfully performing dozens of scientific experiments under low gravity. Page 5

■ Hostile business climate has pushed New Jersey's chemical industry into decline, requires changes in state policy, industry council study finds. Page 6

COVER: Photo by Alan Kahan

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BUSINESS

Rules of origin are currently being scrutinized closely in North American free trade talks, with industry supporting simplified rules and emphasis on tariff shifts. Page 9

Dow has repackaged its hydrocarbons group into a wholly owned subsidiary to better service the company's petrochemicals business in the U.S. Page 10

GOVERNMENT

U.S.-Japan global partnership plan, signed during President Bush's January trip to Japan, is receiving belated interest by State Department officials. Page 16

EPA is revamping its massive and mismanaged contract program, changing the agency's internal operation and relationships with private firms. Page 18

SCIENCE/TECHNOLOGY

Material that is magnetic at room temperature and optically transparent has potential applications in color imaging, refrigeration, and computer memory. Page 20

Process for polymerization of aspartic acid may lead to use of these biodegradable resins instead of polyacrylic acid in certain applications. Page 21

DOE's clean-coal technology demonstration program is entering its final proposal stage, with emphasis on superclean, high-efficiency, coal-based systems. Page 21

Research on embedding chemical compounds in porous glass has reached the point of commercialization with potential licensees being sought. Page 22

COVER STORY

House budget writers tighten 1993 R&D funds for "big" and "little" science programs—and eliminate all Superconducting Super Collider funds—in response to severe budget restraints. Page 13

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Chemical & Engineering News
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LETTERS

Science and society

In his review of Brian Martin's survey of the fluoridation controversy (C&EN, June 29, page 76), Patrick W. Hamlett contrasts the "social constructivist" approach with what he believes to be the traditional approach to scientific progress. He grossly misrepresents the traditional approach and perpetuates a serious error.

According to Hamlett, "Empirical data cannot fully explain why one scientific theory is accepted and others are rejected." An attempt to explain why one scientific theory is accepted or not is itself a theory, and must therefore seek to explain its own acceptance or rejection. In this process, empirical data cannot explain any phenomenon, fully or otherwise. Empirical data are simply anecdotal—they can weigh against a theory, but can never serve to prove a theory—and under no circumstances can they explain a theory.

Hamlett also states that "the scientists' claims to truth should not receive a privileged place." No scientist worthy of the term lays any claim to truth, and a scientist who does claim to have discovered the truth will on that basis alone be regarded suspiciously by genuine scientists, to say nothing of not receiving a privileged place.

In the fluoridation controversy, as with many other scientific issues with broad social (and therefore political) implications, the reasons why some scientists might tentatively accept a theory can be significantly different from the reasons why politicians and citizens accept the social implications of that theory. (This even allows a scientist to view the issue differently in his or her capacity as a scientist and as a citizen.) Much of the heat in this particular issue, for example, was over the political and sociological merits of imposing the scientific implications on the populace by force. Social engineers who pressed for fluoridation clearly never considered that they might be violating a fundamental principle of a free society, because they thought they were acting unselfishly according to delivered scientific truth. Forget that they might have been scientifically wrong (a suggestion that Hamlett clearly weighs more than his critic, Edward Groth); the social constructivist approach merely recognizes that the criticism should not end just because scientific consensus has been reached.

In the fluoridation controversy, the weight of scientific evidence in support of a particular theory was wielded as a club by social engineers who pressed their agenda. Anyone who opposed them on a political or moral basis was therefore a barbarian, or worse, out to increase the misery of the populace. With that opposition, is it any wonder that opponents of fluoridation sought scientific basis for their arguments? This is what Hamlett appears to have documented more fully than his predecessors.

The same perspective on other debates—including, but not limited to, the use of automobile safety belts and motorcycle helmets—might shed some light. It is fundamentally wrong politically, morally, and perhaps even scientifically to force people to do what scientists believe is good for them. Certainly the scientific debate should never be terminated, but even when there appears to be overwhelming evidence in support, the debate over whether or not to force the implications on society will continue to be legitimate.

Dan Karlan
Waldwick, N.J.

Robert Parry

The American Chemical Society should be highly commended for its selection of Robert W. Parry for the Priestley Medal (C&EN, May 25, page 21). He also deserves the title of ideal citizen of the world. I believe that Bob Parry's unique modesty, integrity, unselfishness, morality, and humor had, until the Priestley Award, often allowed colleagues to overlook the fact that he is a great chemist and teacher. He never trumpeted his contributions.

In illustration of his unselfishness, before Bob left Michigan to return to his roots, he took a slender passageway as his office because of a crowded department. In illustration of his tolerance, he insisted that I play not one, but several selections on my harmonica.

Joseph H. Burckhalter
Research Professor
Florida Institute of Technology
Melbourne, Fla.

Correction

• May 18, page 38: In the list of 50-year members of ACS, Robert B. Fischer was incorrectly listed as Robert Richard Fischer.

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House Cuts Wide Swath in 1993 Funds For Federal R&D Projects

■ ***"Big" and "little" science programs get squeezed as budget writers adhere to severe spending restraints***

Janice R. Long, C&EN Washington

While the attention of much of the scientific community was focused on the House's vote to deny fiscal 1993 funding, by a surprisingly wide margin, for one of the so-called big science projects—the Superconducting Super Collider—the budget requests for numerous "little science" programs were also being cut back, sometimes to below current spending levels.

And it's unlikely that money saved by cutting the SSC or any of the other big science projects will find its way into the pockets of little science. This year it's not a question of funding big science or littie science, but big science or no science. Although the Senate has yet to act on any of the fiscal 1993 money bills, its Appropriations Committee is working with the same, very limited amount of money that the House counterpart had to dole out in fashioning next year's federal budget.

A longtime follower of trends in federal science funding sees this year as the dawning of an era of very modest increases or perhaps even level funding for federal science programs that had become accustomed to fairly substantial increases—ranging from 15 to 17% in some cases—during the past several years.

That's because fiscal 1993 is the year in which the highly publicized 1990 budget agreement, which divided federal spending into three separate categories, each with its own spending cap, "is coming home to roost," says Rep. George E. Brown Jr. (D.-Calif.), chairman of the House Committee on Science, Space & Technology. "My own hope, at least in the areas where there is the greatest danger—the big sciences—is just to survive this year and try to improve the situation next year." Brown's committee oversees the operations of the National Science Foundation and the National Aeronautics & Space Administration, as well as the research programs of the Department of Energy and the Environmental Protection Agency.

"The climate for any kind of funding is not very good" this year, he says. "Is it worse for science funding than it is for others? The answer to that is mixed," he adds. "I think for the large science projects it's going to be worse. Because they are a bigger target, they are going to be in serious trouble."

Funding for the SSC was not robust even before the House vote. The Administration had requested a 35% funding increase for the SSC to $650 million, but the Appropriations Committee, citing "severe budget restraints," froze its funding at the current level of about $484 million, even though it said it "strongly supports the construction of the SSC."

C&EN staff photo

Brown: spending caps coming home to roost

If the committee had hoped to forestall further cuts, it was unsuccessful (C&EN, June 22, page 5). The timing of the SSC vote was bad, coming as it did a week after the defeat of a Constitutional amendment that would have required a balanced federal budget. It was an obvious $8 billion target whose costs, opponents argued, were out of control and were robbing not only taxpayers but also important laboratories around the country of funds. And the Texas Congressional delegation was in the uncomfortable position of leading the fight for the SSC, after having been a force behind the balanced budget amendment. Under the House amendment, any savings from terminating the SSC will simply be taken out of DOE's budget, perhaps reducing the deficit. It will not be used to increase funds for other energy research programs.

Brown, for one, is "very unhappy with the way in which the decision to terminate the SSC was made. It was an emotional vote rather than a rational vote. ... There were votes being cast to get even with people—Californians trying to get even with Texans, and Texans trying to get even with Californians. It was not a good way to legislate."

There may be more than a grain of truth there. Budget cutters weren't able to muster enough votes to cut just $700 million from the fiscal 1993 funding for the biggest big science project of all--the Strategic Defense Initiative, which has cost $29 billion to date and was the next big science project to come to the House floor. But they came close, with a vote of 217 against and 201 in favor. As approved by the House, funding for SDI would be up $1.1 billion, or 27% over current spend-

ing, to $4.2 billion. However, the Administration had asked for a 60% increase to $5.3 billion. If the amendment had passed, sponsors said the $700 million would also have been used to reduce the deficit.

The next test for big science will involve funding for space station *Freedom*. The Appropriations Subcommittee on VA, HUD & Independent Agencies has recommended that NASA's overall budget be set at $13.9 billion, which is several hundred million dollars below the current level of funding and about $1 billion below the President's request, Brown says. The subcommittee has also recommended $1.75 billion for the space station, "which is way below [both] the current level of funding and the President's request." The full Appropriations Committee is expected to take the Veterans Affairs, Housing & Urban Development, and Independent Agencies bill up this week, with a vote by the full House probably coming during the week of July 27.

Space station supporters will most likely argue that the subcommittee's recommended cut of 12% in station funding, if it is approved by the full Appropriations Committee, is more than enough to show fiscal responsibility. However, Brown says, "it is my expectation that an amendment will be offered on the House floor to cut [the space station] completely, except for termination costs." But he adds, "We expect to defeat that amendment."

All the attention focused on big science has somewhat obscured the fact that little science isn't faring very well either. Brown says, "The normal science programs, and that includes all of the National Institutes of Health and all of NSF, are going to suffer some cuts, but they are going to continue to grow; it's just that the rate of growth won't be as rapid." For DOE, he expects it "to end up with zero growth or small cuts in their other science budgets. So, it's just not a good year."

That certainly is holding true of funding for DOE's other science programs in fiscal 1993, though the road to level funding can be tricky. For example, the Appropriations Committee at first agreed with the Administration's request for a 6% increase to $814 million in funding for DOE's basic energy sciences program. That included an increase of 11% to $175 million for chemical sciences and of 13% to $290 million for materials sciences. But then the committee, citing "severe budget constraints," imposed a general reduction of $49 million, which brought the program's funding back down to its current level of $765 million and left programs such as chemical sciences, whose funding was frozen at last year's level this year, looking at another bleak budget year.

Funding for nuclear R&D would be down 10% to $304 million, and that for biological and environmental research and magnetic fusion research would increase just 1%. The only bright spots in the DOE R&D budget so far are those areas related to cleaning up contamination at DOE facilities, which would be up 18% to $710 million, and energy conservation, up 20% to $311 million. That funding for energy conservation might change, however, since it has not yet come up for a floor vote in the House.

Overall funding for the Department of Defense's R&D programs would be unchanged from this year's $38.5 billion, under its House-passed appropriations bill. The Navy's research funding, however, would increase, up 9% to $9.3 billion. Army research would be cut 12% to $5.8 billion, Air Force research would be cut 3% to $13.7 billion, and research by the defense agencies would be down 5% to $9.5 billion. The House bill would direct DOD to invest $180 million in advanced materials research; $20 million in the computer consortium, Sematech; and $330 million in manufacturing technology development in 1993. The manufacturing technology program would fund such things as the National Center for Excellence in Manufacturing Technology, advanced gear manufacturing, and the design and manufacturing of high-performance composites. The bill also would provide full funding, $176 million, for the national aerospace plane.

The only other research-related appropriation bill approved by the House before it recessed for the Democratic National Convention was that providing funding for the U.S. Department of Agriculture. Overall USDA research funding would be down 5% to $1.3 billion under the bill, with the Cooperative State Research Service taking the hardest hit, down 12% to $446 million, which is still 7% more than the Administration requested. However, the Appropriations Committee did not provide the 54% increase to $150 million requested for the National Research Initiative, which supports the only research grants at USDA distributed under a competitive peer review system. Instead, it froze funding for the initiative at the current level of $97.5 million.

It also ignored the Administration's request for a funding cut of 60% in the special research grants program—which was prominent on President Bush's list of pork-barrel projects that he wanted cut from the federal budget earlier this year (C&EN, May 25, page 14). Although defending the program as applied development that didn't need to be peer reviewed or awarded on a competitive basis, the committee did cut it back 21% from current spending levels to $57.7 million and cut the number of projects supported under the program from 141 to 85.

That didn't satisfy members of the House's self-styled "Porkbusters Coalition" who backed a floor amendment to cut all funding for special research grants. Coalition cochairman Harris Fawell (R.-Ill.) said the program represented the "purest form of pork-barrel spending, not because of the subject matter of the 85 spending projects but because it completely bypasses established procedures and criteria for spending." Fawell admitted there wasn't really that much money at stake but maintained, "if we are unable—or unwilling—to cut funding for 85 projects that have basically bypassed the appropriations process, then I doubt very much we will make hard choices necessary to even significantly cut the projected $400 billion deficit for fiscal 1993," let alone bring the federal deficit under control without the Constitutional mandate rejected three weeks ago. However, after a spirited debate that actually consumed more than twice as much space in the *Congressional Record* as the debate concerning cutting SDI funding $750 million, Fawell's amendment was also defeated.

NSF's fiscal 1993 budget, which advances in tandem with NASA's, is scheduled for full committee markup this week. The American Chemical Society last week sent a letter to Appropriations Committee chairman Jamie L. Whitten (D.-Miss.), and, for good measure, to 434 other House members, ex-

House actions bode ill for 1993 research funding

$ Millions	1993 House appropriation	1993 Administration request	1992	% difference Appropriation-requested	% change 1992–93
DOD R&D	$38,520.5	$38,626.4	$38,765.9	0%	–1%
Tactical programs	13,773.1	13,241.1	14,742.7	4	–7
Intelligence & communications	4,629.1	5,011.2	5,201.4	–8	–11
Technology base	4,608.9	4,083.9	4,184.8	13	10
Strategic programs	4,366.5	4,507.1	4,278.7	–3	2
Defensewide mission support	4,360.0	3,960.8	3,846.8	10	13
Strategic Defense Initiative	4,237.5	5,312.4	3,321.3	–20	27
Advanced technology development	2,545.4	2,509.9	3,090.2	1	–18
NASA R&D[a]	6,679.7	7,687.4	7,004.7	–13	–5
Space station[b]	1,750.0	2,238.9	1,986.8	–22	–12
Energy	5,271.4	6,580.1	6,309.1	–29	–16
Energy R&D	4,469.8	5,165.9	4,876.5	–13	–8
General science & research	965.2	1,652.7	1,472.5	–42	–35
Superconducting Super Collider[b]	0	650.0	483.7	–100	–100
Basic energy sciences	764.7	813.9	764.7	–6	0
Environmental restoration & waste management	709.7	707.0	602.5	0	18
Fossil fuels[c]	412.6	311.3	452.3	32	–8
Biological, environmental	356.7	384.7	353.3	–7	1
Fusion	339.7	359.7	337.1	–6	1
Nuclear	304.3	310.3	336.7	–2	–10
Conservation[c]	311.4	326.1	260.1	–5	20
Solar, other renewables	249.8	245.9	242.8	2	3
University & science education programs	55.7	55.7	54.5	0	2
Weapons R&D	1,431.6	1,414.2	1,432.6	1	0
NSF[a]	2,541.0	2,888.0	2,465.8	–12	3
Research & related activities	1,879.0	2,211.5	1,879.8	–15	0
Education & human resources	465.0	479.5	465.0	–3	0
Antarctic program	163.0	163.0	88.0	0	85
Instrumentation & facilities	33.0	33.0	33.0	0	0
Critical Technologies Institute	1.0	1.0	0	0	100
USDA	1,327.1	1,300.4	1,396.7	2	–5
Agricultural Research Service	694.4	714.0	711.5	–3	–2
Cooperative State Research Service	446.0	416.3	504.7	7	–12
Forest research[c]	186.7	170.1	180.5	10	3
EPA extramural R&D[a]	338.5	341.0	323.0	–1	5
TOTAL	$54,678.2	$57,423.7	$56,265.2	–5%	–3%

Note: All numbers are estimates. **a** Amounts recommended at appropriations subcommittee level. **b** Funds included in total. **c** Amount approved by the Appropriations Committee.

pressing its concern that "if domestic discretionary budget cuts become necessary during the fiscal 1993 appropriations process, continued funding for space station *Freedom* may weaken support for scientific programs, particularly those within NSF and EPA." ACS recommends that, if such cuts do become necessary, the space station program be postponed in favor of other basic scientific research priorities in the bill, which "will enable the U.S. to meet today's economic challenges and to prepare for those of tomorrow."

At press time it was too early to tell if ACS's recommendation would be heeded. The VA subcommittee has recommended that funds for NSF's research and related activities account be frozen at the current level of $1.9 billion, and that the reductions from the $2.2 billion budget request be spread proportionately across all scientific disciplines. It also recommends that funds for research facilities and instrumentation be frozen at $33 million and that those for education and human resources remain at $465 million. The Appropriations Committee, to date, has been accepting the majority of its subcommittees' funding recommendations.

There is no guarantee, however, that if space station funding is canceled, that that money would be used to increase funding for NSF and/or EPA. As Brown recently reminded his colleagues after the SSC vote: "Any money that is saved by terminating the SSC will not necessarily flow to other scientific projects, regardless of whether they are high or low priority. In fact, despite rhetoric to the contrary, terminating the SSC may not even lead to deficit reduction. Because of the nature of the appropriations process, it is just as likely that any SSC savings will be expended on nonscientific programs such as water development." Money saved by delaying or terminating the space station is just as likely to go for veterans health programs or to support housing for the poor.

Brown also pointed out that "big science projects are not big because of pork-barrel considerations. They are large because shared, complex facilities have become essential to scientific progress in a whole range of disciplines, including astronomy, oceanography, computing, and biology, as well as physics." And he warned: "If we expect to continue to be world leaders, we cannot expect to revolutionize science by watching apples fall from a tree. We will need an appropriate balance of small and big science. It is mindless to oppose all big science projects, simply because they are big. In doing so, we virtually guarantee that many fundamental breakthroughs in our understanding of nature will not occur in the U.S." □

Third Set of 1992 PRF Grants Approved

Acting on recommendations from the May meeting of the Petroleum Research Fund Advisory Board, the ACS Board of Directors approved 164 new or continuing ACS-PRF grants-in-aid. Forty-one of the grants include a supplement of $3000 to involve an undergraduate student in the research. May commitments total $5,036,160. The recommended grants were selected from 460 proposals and are the last projects to be funded in 1992. Total ACS-PRF grant commitments in 1992 are $14,413,529. ACS-PRF grants are funded by income from a trust established in 1944 by seven major oil companies. No ACS member dues income is used for PRF grants or administrative expenses.

The maximum values for ACS-PRF grants in 1993 have been increased: Type AC, $25,000 per year for up to three years; Type B, $25,000 over two years; and Type G (starter), $20,000 over two years. Applicants should note the revised limits for the scientific text of 4000 words for PRF Type AC and B proposals, and 1700 words for Type G proposals. For 1993 grants, the maximum salary and benefits that the principal investigator may receive each year will be $5000, and the annual limit for travel will be $1000. Applicants from Ph.D.-granting departments may request a $3000 supplement to fund an undergraduate research student.

Proposals for projects to commence in 1993 are invited for all ACS-PRF research grant programs. Information and application forms may be obtained from the Petroleum Research Fund, American Chemical Society, 1155—16th St., N.W., Washington, D.C. 20036, or by calling (202) 872-4481.

ACS-PRF Grants for Fundamental Research in the Petroleum Field (Type AC)

Richard W. Allmendinger, Cornell U. The Importance of Small Faults in Compressional and Extensional Deformation. $40,000

Robert S. Anderson, U of California, Santa Cruz. Response of Badlands to Base Level Forcing: Examples from the Fremont River on the Colorado Plateau. $43,000

Paul F. Barbara, U of Minnesota. Definitive Vibrational Spectroscopy of the Solvent-Coordinate/Solvation Sphere. $40,000

Peter F. Bernath, U of Arizona. Laser and Fourier-Transform Spectroscopy of Free Radicals. $40,000

Robert A. Bernheim, Pennsylvania State U. Effects of Optical Orientation on Chemical Equilibria. $40,000

Norman O. Birge, Michigan State U. Nonlinear Susceptibilities and the Glass Transition. $40,000

Donna G. Blackmond, U of Pittsburgh. Spectroscopic Studies of Adsorption and Reaction over Supported Ru Catalysts for Selective Hydrogenation Reactions. $43,000

John R. Bleeke, Washington U. Synthesis and Reactivity of Metallacyclohexadiene and Metallabenzene Complexes. $40,000

R. Mark Bradley, Colorado State U. The Effect of Grain Asphericity on the Properties of Sandstones. $40,000

David A. Budd, U of Colorado. A Chemostratigraphic Analysis of a Paleozoic Upwelling Zone in the Permian Phosphoria Sea, West-Central Wyoming and Eastern Idaho. $40,000

Drury S. Caine, U of Alabama. The Synthesis of 7-Heterosubstituted Bicyclo [2.2.1] Heptanones via Anion-Assisted Diels-Alder Reactions. $43,000

John P. Caradonna, Yale U. Reactivity Models for Nonheme Iron Metalloenzymes. $43,000

Louis A. Carpino, U of Massachusetts. A Superior Peptide Coupling Additive. $43,000

Kenneth G. Caulton, Indiana U. π-Donor-Stabilized Unsaturation: Principles and Applications. $43,000

S. H. Chan, U of Wisconsin, Milwaukee. Solubility and Polymerization of Silica in Hydrothermal Fluids. $40,000

David S. Chapman, U of Utah. Thermal History of the Taranaki Sedimentary Basin, New Zealand. $43,000

Nicholas Christie-Blick, Columbia U. Late Devonian Sequence Stratigraphy of the Canning Basin, Australia: Implications for Eustasy and Applications in Petroleum Exploration. $40,000

Milton W. Cole, Pennsylvania State U. Physical Adsorption on Weak Binding Surfaces. $40,000

Philip Coppens, State U of New York, Buffalo. The Response of Transition-Metal Compounds to External Perturbations. $40,000

Joyce Y. Corey, U of Missouri, St. Louis. Catalyzed Dehydrocoupling of Silanes: Routes to Catenated Silicon Compounds. $40,000

Stephen P. Cramer, U of California, Davis. High-Resolution Time-Resolved X-Ray Fluorescence: Application to Photosynthetic Manganese. $40,000

Robert C. Dunbar, Case Western Reserve U. Low-Temperature Ion Chemistry in a Cooled FT-ICR Ion Trap. $60,000

Mark D. Ediger, U of Wisconsin, Madison. Molecular Investigation of Physical Aging in Polystyrene. $43,000

Eric D. Edstrom, Utah State U. Conformational and Stereochemical Factors in the Synthesis of Medium-Ring Lactams. $40,000

Derek Elsworth, Pennsylvania State U. Real-Time Hydraulic Fracture Characterization from Adjacent Well Data. $40,000

James P. Evans, Utah State U. Field and Microstructural Analyses of Deformation in Footwalls of Thrust Faults: Significance for Geometry, Kinematics, and Mechanics of Thrust Fault Evolution. $37,800

James M. Farrar, U of Rochester. Mass-Selected Solvated Cluster Ions: Size-Dependent Photochemistry. $60,000

Richard G. Finke, U of Oregon. Synthesis and Characterization of Polyoxoanion-Ruthenium Oxygenation Catalysts: Oxidation-Resistant Inorganic Porphyrin Analogs. $43,000

David A. Forsyth, Northeastern U. NMR Isotope Shifts as a Probe of Organic Structure. $40,000

Raymond P. Freeman-Lynde, U of Georgia. Geochemical Investigation of Equant Calcite Spars in Limestones from DSDP Sites 390 and 392, Blake Nose: Implications for Deep-Marine Diagenesis of Shallow-Marine Carbonate Platforms. $40,000

Michael D. Fryzuk, U of British Columbia. New Lewis Acid-Lewis Base Interactions. $40,000

John F. Garst, U of Georgia. Radical Exchange in Grignard Reagent Formation. $40,000

Dana H. Geary, U of Wisconsin, Madison. Foraminiferal Stable Isotopes and the Miocene-Recent Environments of the Eastern Equatorial Pacific and Southwestern Caribbean. $40,000

John L. Gland, U of Michigan. Surface Reduction of Hydrocarbons and Alcohols by Hydrazine on Platinum, Rhodium, and Iridium Surfaces. $40,000

Richard D. Gonzalez, Tulane U. The Preparation of Silica-Supported High-Surface-Area Metal Catalysts by the Sol-Gel Method. $40,000

Ronald L. Halterman, U of Oklahoma. Synthesis and Applications of Chiral Bridged Metallocenes. $40,000

Mark J. Hampden-Smith, U of New Mexico. Molecular Routes to Complex Metal Oxides with Controlled Stoichiometry. $40,000

Thomas J. Hanratty, U of Illinois, Urbana-Champaign. Polymer Drag-Reduction. $43,000

W. Dean Harman, U of Virginia. Dihepto-Coordinated Phenols as Organic Synthons. $43,000

Harold C. Helgeson, U of California, Berkeley. Chemical Interaction of Minerals and Hydrocarbons with Aqueous Solutions in Sedimentary Basins. $40,000

James W. Herndon, U of Maryland, College Park. Homo-Michael Addition Reactions Using Cyclopropylcarbene Complexes. $40,000

Jonathan J. L. Higdon, U of Illinois, Urbana-Champaign. Dynamics of Concentrated Polydisperse Suspensions. $40,000

David A. Hodell, U of Florida. Global Correlation of Oligocene-Miocene Strata Using Strontium Isotope Stratigraphy. $40,000

David W. Houseknecht, U of Missouri, Columbia. Inorganic and Organic Thermal Maturity Indexes in Shales. $40,000

Andreas J. Illies, Auburn U. Gas-Phase Two-Center Three-Electron Bonding in Organic Molecules and Ion-Molecule Clustering Involving H_3O^+, H_2O^+, NH_4^+ and NH_3^+. $40,000

Paul W. Jewell, U of Utah. Coastal Circulation Models and the Prediction of Geochemical Facies in Upwelling Zones. $43,000

Mercouri G. Kanatzidis, Michigan State U. Chemistry of Soluble Metal Polychalcogenides. $40,000

Steven R. Kass, U of Minnesota. Vinyl and Cyclopropyl Anions: Formation, Reactivity, Structural Stability, and Thermodynamic Properties. $43,000

Hilkka I. Kenttamaa, Purdue U. Ion-Molecule Reactions of Distonic Radical Cations in the Gas Phase. $40,000

Sangtae Kim, U of Wisconsin, Madison. Microhydrodynamics of Complex Aggregates. $40,000

Bernard Kirtman, U of California, Santa Barbara. Accurate Calculation of Electron Correlation, Nonresonant Frequency Dispersion, and Vibrational Distortion Effects on Nonlinear Optical Properties of Conjugated Polymers. $40,000

Satyendra Kumar, Alfred Saupe, Kent State U. Precision Heat Capacity and High-Resolution X-Ray Diffraction Study of Phase Transitions in Surfactant Solutions. $43,000

Harold H. Kung, Northwestern U. Role of Metal-Oxygen Bond Strength and Reduced Cations in Selective Oxidation of Hydrocarbons. $43,000

Paul M. Lahti, U of Massachusetts. Dinitrene Models of Exchange Coupling: Investigations of Organic Ferromagnetism. $40,000

Stephen Lee, U of Michigan. Second Moment Scaling and Covalent Crystal Structure. $40,000

David B. Loope, U of Nebraska, Lincoln. Eolian Reworking and Meteoric Diagenesis at a Subtle Jurassic Unconformity, Central Wyoming. $40,000

Przemyslaw B. Maslak, Pennsylvania State U. Magnetic Interactions in Perfluorinated Radicals. $43,000

Lon J. Mathias, U of Southern Mississippi. Adamantane-Based Dendrimers and Pseudo-Buckyballs: Synthetic Approach to Molecules-in-a-Box. $43,000

Krzysztof Matyjaszewski, Carnegie Mellon U. Living Cationic Polymerization of Alkenes: Exchange Processes. $40,000

Lisa McElwee-White, Stanford U. Photooxidative Cyclizations of Metal Carbynes. $43,000

Philip A. Meyers, U of Michigan. Early Diagenesis of Lacustrine Organic Matter. $43,000

Gary A. Molander, U of Colorado. Organolanthanides as Catalysts in Selective Organic Synthesis. $40,000

Philip C. Nelson, U of Pennsylvania. Shape Changes in Surfactant Bilayers and Interfaces. $40,000

Peter Nordlander, Rice U. Nonadiabatic Effects in Atom-Surface Scattering. $40,000

John P. Oliver, Wayne State U. Synthesis, NMR, and Structural Studies on Organoaluminum Compounds. $40,000

Catherine J. Page, U of Oregon. Self-Assembled Multilayer Structures Based on Novel Inorganic-Organic Layered Compounds. $40,000

Vernon D. Parker, Utah State U. Thermochemistry of S_N1 Ionization Reactions of Alkyl Halides. $40,000

George A. Parks, Stanford U. Direct Observation of Hematite Dissolution by Organic Acid. $40,000

Laura A. Philips, Cornell U. The Role of Vibrational Mode-Coupling in Chemical Reactions. $40,000

Donald J. Plazek, U of Pittsburgh. The Recoverable Creep Compliance of Glass-Forming Materials. $40,000

Richard P. Polniaszek, Duke U. Preparation and Synthetic Utility of Phosphorus Heterocycles. $43,000

Kevin T. Potts, Rensselaer Polytechnic Inst. 1,4-Dipolar Cycloaddition Route to Aspidosperma Alkaloids. $40,000

Philip P. Power, U of California, Davis. Synthesis and Reactivity of Compounds with Multiple Bonding between Main Group 3 Elements. $40,000

Thomas R. Rizzo, U of Rochester. New Spectroscopic Probes of Intramolecular Dynamics. $40,000

James P. Runt, Pennsylvania State U. Quantitative Fractographic Analysis of Polymers. $43,000

Dilano K. Saldin, U of Wisconsin, Milwaukee. Chemically Specific Local Crystallography by X-Ray Absorption, Photoemission, and Holography. $40,000

Charles P. Scholes, State U of New York, Albany. Application and Technical Development of Stopped-Flow EPR. $40,000

Gary J. Schrobilgen, McMaster U. New Synthetic Initiatives in the Chemistry of Highly Electronegative Fluorinated Ligands. $40,000

Don Secrest, U of Illinois, Urbana-Champaign. Angular Momentum in Molecular Collisions. $43,000

Kevin L. Shelton, U of Missouri, Columbia. Diagenesis of Cambrian and Ordovician Platform and Basinal Carbonates by Basinal Fluids: Petrologic and Geochemical Studies in the Reelfoot Graben, Southeastern Missouri. $40,000

Steven J. Sibener, U of Chicago. Molecular Beam Studies of Surface Chemical Kinetics. $63,000

J. Antonio Simo, U of Wisconsin, Madison. Porosity Preservation in Waulsortian Buildups, Lower Carboniferous Pekisko, West-Central Alberta. $33,560

Johannes Smid, State U of New York, C of Environmental Science & Forestry. Novel Amphiphilic Hydrogels with Immobilized Cation-Chelating Ligands. $40,000

Paul E. Sokol, Pennsylvania State U. Structure and Dynamics of Adsorbed Systems in Porous Media. $43,000

Kenneth S. Suslick, U of Illinois, Urbana-Champaign. Porphyrin Assemblies. $40,000

Philip L. Taylor, Case Western Reserve U. Theory of Phase Separation in a Polymerizing Mixture. $40,000

Gregory R. J. Thatcher, Queen's U. Hydrophobic Catalysis and Transition-State Structure. $40,000

Michael A. Walters, Dartmouth C. General Investigations of a Mild and Efficient 3-Aza-Claisen Rearrangement. $40,000

Peter T. Wolczanski, Cornell U. C–N Bond Cleavage Reactions Relevant to Hydrodenitrogenation. $40,000

Ralph T. Yang, State U of New York, Buffalo. Simultaneous Purification and Sorbate Recovery by New Pressure-Swing Adsorption Cycles. $40,000

Danny L. Yeager, Texas A&M U. Developments with Multiconfigurational Linear Response for Electronic Excitation Energies and Response Properties. $40,000

Tadeusz W. Zerda, Texas Christian U. Molecular Motion of Small Molecules in Porous Sol-Gel Glass. $43,000

William J. le Noble, State U of New York, Stony Brook. Measurement and Control of Face Selection in Heteroadamantanones. $40,000

ACS-PRF Grants for Fundamental Research in the Petroleum Field (Type B)

Edward R. Biehl, Southern Methodist U. Investigation of the Synthetic Utility of the Tandem Addition-Rearrangement and Aryne Arylation Reactions for the Elaboration and Annulation of Certain Fused Aromatics. $20,000

Andrew P. Craft, Lafayette C. Phase Diagrams for Hydrogen in Alloys of the Group 5B Metals via Differential Scanning Calorimetry. $19,600

Franklin P. DeHaan, Occidental C. Scope, Kinetics, and Mechanism of Double-Agent Halogenation. $20,000

Gregory W. Ebert, State U of New York, Buffalo. The Direct Formation of Haloaryl and Halovinyl Copper Reagents via Activated Copper. $20,000

Richard H. Fluegeman, Ball State U. Late Eocene Benthic Foraminiferal Paleoecology of the Mossy Grove Cove, Hinds County, Mississippi. $17,500

Raymond J. Giguere, Skidmore C. Novel Intramolecular Ene Reactions. $20,000

Gary H. Girty, San Diego State U. A Comprehensive Sedimentological Model for Chert-Argillite Units in the Lower Paleozoic Shoo Fly Complex. $20,000

Karen I. Goldberg, Illinois State U. Reactivity Trends in Reductive Elimination Reactions. $20,000

Martin R. Hulce, Creighton U. Nucleophilic 1,8 Additions to Mixed-Hybridization-State, Conjugated Ketones: Neocarzinostatin Chromophore Models. $20,000

Frederick W. King, U of Wisconsin, Eau Claire. On the Question of the Stability of the Halide Ion. $20,000

Dennis W. Lindle, U of Nevada, Las Vegas. Ionization and Fragmentation Dynamics of Gases Using Hard X-Ray Synchrotron Radiation. $20,000

John A. Maguire, Southern Methodist U. Theoretical Studies of Main-Group π-Complexes. $20,000

Mark D. Marshall, Amherst C. Diode Laser Spectroscopy of Ammonia-Containing van der Waals Complexes: Models for Hydrogen Bonding. $20,000

Ronald L. Musselman, Franklin & Marshall C. Polarized Specular Reflectance of Metalloprotein Models and One-Dimensional Conductors. $20,000

Charles G. Oviatt, Kansas State U. Lake Bonneville Marl Stratigraphy and Lake Fluctuations. $20,000

Robert S. Paley, Swarthmore C. Asymmetric Cycloadditions of Enantiopure Unsaturated Sulfoxides and Sulfoximines. $20,000

Brady P. Rhodes, California State U, Fullerton. Investigation of a Metamorphic Core Complex in Northern Thailand: A Study of the Doi Suthep Mylonites, Chiang Mai District. $20,000

Herbert B. Silber, San Jose State U. Metal Ion Complexation Reactions. $20,000

Jinke Tang, Ashok Puri, U of New Orleans. Study of Room-Temperature Magneto-Optical Recording Materials. $20,000

John F. Taylor, Indiana U of Pennsylvania. Biostratigraphy of Late Cambrian and Early Ordovician Carbonates in the Central Appalachians. $20,000

Gerald R. Van Hecke, Harvey Mudd C. Thermodynamic Excess Functions Measured by Laser Light Scattering. $20,000

Patty Wisian-Neilson, Southern Methodist U. New Sulfur-Containing Phosphazenes. $20,000

ACS-PRF Grants for Fundamental Research in the Petroleum Field (Type G)

Michael T. Ashby, U of Oklahoma. Lamellar Solid-State Organization with Amphiphilic Metal-Organic Compounds. $21,000

Nitash P. Balsara, Polytechnic U. Complex Polymer Fluids. $18,000

Scott W. Barton, U of Massachusetts. Structure in the Ion-Conducting Phase of Polymer Electrolytes: A Differential Anomalous X-Ray Scattering Study. $18,000

John G. Brennan, Rutgers U. Organosoluble Metal Oxide Nanoclusters. $21,000

Vince Cammarata, Auburn U. Synthesis, Spectroscopy, and Electrochemistry of Aromatic and Inorganic Langmuir-Blodgett Films. $18,000

Joseph I. Cline, U of Nevada, Reno. Laser Spectroscopic Studies of Reaction Mechanism and Dynamics in Large Molecules. $21,000

Peter K. Dorhout, Colorado State U. Synthesis and Characterization of Novel Materials of Ternary Noble-Metal Chalcogenides. $18,000

Erik J. Fernandez, U of Virginia. Magnetic Resonance Imaging Analysis of Miscible Viscous Fingering in Porous Media. $21,000

Katherine H. Freeman, Pennsylvania State U. Molecular and Isotopic Biogeochemistry of Sinking Particles in the Black Sea. $18,000

Miguel A. Garcia-Garibay, U of California, Los Angeles. The Norrish Type-II Reaction of Ditopic Aromatic Ketones: An Entry to Chemical Dynamics and Structure-Reactivity Correlations in Solid-State Organic Chemistry. $21,000

John H. Griffin, Stanford U. Semisynthetic Vancomycin Derivatives with Catalytic Activity. $21,000

John M. Jean, Washington U. Ground-State and Transient Resonance Raman Scattering from Strongly Coupled Porphyrin Macrocycles. $21,000

Leslie S. Jimenez, Rutgers U. Photo-Driven On-Off Switches: Azobenzene and Anthracene Cyclophanes. $21,000

Graham B. Jones, Clemson U. Chiral Arene Chromium Tricarbonyl-Based Lewis Acids as Enantioselective Catalysts. $21,000

Frederick R. Lemke, Ohio U. Synthesis and Reactivity of Transition-Metal Silylene Complexes. $21,000

Gwendolyn L. Macpherson, U of Kansas. Bromide in Formation Water: An Organic Source? (An investigation of the magnitude of dissolved Br which could be sourced from organic matter, in Gulf of Mexico Basin and in Kansas). $18,000

Ann E. McDermott, Columbia U. Enzyme Dynamics and Catalytic Mechanisms by Solid-State NMR: The Photosynthetic Reaction Center and Triose Phosphate Isomerase. $18,000

J. Thomas McKinnon, Colorado School of Mines. Gas-Phase Oxidation of Aromatics by Singlet Oxygen. $21,000

Anne S. Meltzer, Lehigh U. Crustal Structure and Rock Properties Offshore Central California from Combined Vertical Incidence and Wide-Angle Seismic Data. $21,000

Kate C. Miller, U of Texas, El Paso. Deep-Penetration Seismic Reflection Studies of the California Continental Borderland. $21,000

Johannes M. Nitsche, State U of New York, Buffalo. Enhancement of Size-Exclusion and Hydrodynamic Chromatography by Tailoring of Porous Microenvironments, Flow Tuning and Stationary-Phase Staging. $18,000

Thomas S. Scanlan, U of California, San Francisco. New Methods for Improving the Efficiency of Catalytic Antibodies. $18,000

Kirk H. Schulz, U of North Dakota. Desulfurization of C_1 Organosulfur Molecules on MoS_2 Model Catalysts. $21,000

Vatche P. Tchakerian, Texas A&M U. The Investigation of Textural, Micromorphological, and Mineralogical Changes Associated with Sandy Paleosols and Their Eolian Parent Sediments. $18,000

Timothy L. Ward, U of New Mexico. Fabrication of Ultrathin Supported Nonporous Inorganic Membranes Using Chemical Vapor Infiltration. $21,000

Yue Wu, U of North Carolina, Chapel Hill. A Nuclear Magnetic Resonance Study of Small Clusters. $21,000

Gergely T. Zimanyi, U of California, Davis. Phenomenology and Microscopics of High-Temperature Superconductors. $18,000

Timothy P. Curran, C of the Holy Cross. Development of a Robust Prolyl-Proline Dipeptide α-Helix Template. $18,000

Steven M. Drew, Carleton C. Synthesis and Electrochemical Polymerization of Vinyl-Substituted Iron Porphyrins. $18,000

Gregory D. Foster, George Mason U. Supercritical Fluid Extraction Coupled with Gas Chromatography in the Trace Analysis of Organic Substances. $18,000

Carl H. Grossman, Swarthmore C. Second Harmonic Generation in Organic Molecular Single Crystals. $18,000

Paul G. Jasien, California State U. Computational Studies of Reactivity Enhancement by $AlCl_3$. $18,000

Sandra L. Laursen, Kalamazoo C. Selection of Spin Multiplicity in Matrix Photoreactions of NH with Hydrocarbons. $18,000

Richard S. Lumpkin, U of Alabama, Huntsville. New Chromophore Sensitizers for Liquid Junction Photoelectric Devices Based on Wide-Bandgap Semiconductors. $18,000

Nancy R. Riggs, Northern Arizona U. Analysis of Volcanic Detritus in the Lower Chinle Formation, Colorado Plateau: Source Areas and Influence on Basin Evolution. $18,000

Philip J. Rous, U of Maryland, Baltimore County. Theoretical Studies of Resonance Electron Scattering by Adsorbed Molecules. $18,000

Suzanne E. Sherman, U of South Florida, New C. Investigation of Metal-Carbohydrate Interactions: A Synthetic Analog Approach to the Active Site of Rubisco. $18,000

David W. Taylor, Indiana U Southeast. Investigation of Fossil Plant $\delta^{13}C$ and Changes in Coal $\delta^{13}C$ from the Paleozoic-Mesozoic to Cenozoic. $18,000

ACS-PRF Grants for Fundamental Research in the Petroleum Field (Type SE)

Harry R. Allcock, on behalf of ACS Division of Polymer Chemistry. Inorganic and Organometallic Polymers, ACS national meeting, Denver, spring 1993. $2000

H. Michael Cheung, on behalf of ACS Division of Industrial Engineering Chemistry. Polymeric Surface-Active Materials, ACS national meeting, Denver, spring 1993. $2000

Patricia A. Johnsson, William H. Casey, on behalf of ACS Division of Geochemistry. Mineral/Water Interface Geochemistry: Honoring Paul W. Schindler, ACS national meeting, Denver, spring 1993. $2000

George B. Kauffman, on behalf of ACS divisions of History of Chemistry, Inorganic Chemistry, and Chemistry Education. Coordination Chemistry, ACS national meeting, Denver, spring 1993. $2000

Thomas E. Mallouk, on behalf of ACS Division of Colloid & Surface Chemistry. Chemically Sensitive Interfaces, ACS national meeting, Chicago, fall 1993. $2000

Reginald H. Mitchell, on behalf of U of Victoria. Novel Aromatic Compounds, 7th International Symposium on Novel Aromatic Compounds (ISNA-7), Victoria, British Columbia, July 1992. $2000

Richard W. Ojakangas, on behalf of International Basement Tectonics Assn. and U of Minnesota, Duluth. Basement Tectonics 10th International Conference on Basement Tectonics, U of Minnesota, Duluth, fall 1992. $1700

Raphael M. Ottenbrite, on behalf of ACS Division of Polymer Chemistry. Polymeric Drugs and Drug Delivery, ACS national meeting, Washington, D.C., fall 1992. $2000

Hanna Reisler, on behalf of ACS Division of Physical Chemistry. Photochemistry from Isolated Molecules to Solutions, ACS national meeting, Washington, D.C., fall 1992. $2000

Norman W. Standish, on behalf of ACS Division of Petroleum Chemistry. Chemistry of the Atmosphere, Washington, D.C., 1992. $1000

Laren M. Tolbert, on behalf of The Inter-American Photochemical Society. The 5th Winter Conference of the Inter-American Photochemical Society, Clearwater Beach, Fla., January 1993. $2000

Nominations for Buck-Whitney Award

The ACS Eastern New York Section is soliciting nominations for the 1993 Buck-Whitney Award. The award consists of a medal and a $1000 honorarium. The nominee must be a resident of North America whose original work in pure or applied chemistry has not yet received national attention. The nominee's work can be in either experimental or theoretical aspects of any area of chemistry. Send nomination letters to Malcolm R. Bell, RD 1, Box 156A, East Greenbush, N.Y. 12061, by Nov. 1. □

Call for nominations for Spencer Award

The ACS Kansas City Section is soliciting nominations for the 38th annual Kenneth A. Spencer Award for Outstanding Achievement in Agricultural Chemistry. The award, which recognizes meritorious achievements in the fields of agricultural and food chemistry, is given in the hope of providing added stimulus to those engaged in research, education, and industry to continue to contribute to the advancement of agricultural chemistry. The award will be presented in February 1993. The recipient of the award will receive a medal and a $5000 honorarium. The deadline for submission of nominations is Sept. 1. Nomination forms and further information are available from Ernest Parente, chairman, Spencer Award, Marion Merrell Dow, P.O. Box 9627, Kansas City, Mo. 64134-0627, phone (816) 966-5000. □

Nominees wanted for Tyler Prize

Nominations are being sought for the Tyler Prize, the World Prize for Environmental Achievement. The award consists of $150,000. Nominees may be associated with any field of science. Prizes are awarded for either the protection, maintenance, improvement, or understanding of ecological and environmental conditions or for the discovery, development, improvement, or understanding of known or new sources of energy.

Nominations should include the name, address, title, affiliation, and vita or résumé of the nominee. Nominations of institutions should identify the administrative officer of the organization responsible for the contributions cited. In addition, a summary of the individual's or institution's contributions, a detailed description of contributions, and at least three letters of recommendation are required. Nominations are due Oct. 1.

Mail nominations to Jerome B. Walker, Executive Director, Tyler Prize, Office of the Provost, University of Southern California, Los Angeles, Calif. 90089-4019, phone (213) 740-6559, fax (213) 740-1313.

Nominations sought for analytical awards

The ACS Division of Analytical Chemistry Awards Canvassing Committee is seeking candidates for four awards given annually by the division. The Award for Excellence in Teaching is given to an individual teaching at the graduate or undergraduate level who has definitively and uniquely enhanced the professional and personal development of students in analytical chemistry. The awards in chemical instrumentation, spectrochemical analysis, and electrochemistry are given to individuals who have made original and eminent contributions to the advancement of their respective fields. Each award consists of $4000, a plaque or a certificate, and up to $1000 in travel expenses to attend the ACS fall national meeting at which the award will be presented.

Deadlines for submitting nominations are available from the committee. Eligibility for awards is not restricted to members of the Division of Analytical Chemistry, and nominating and secondary letters may also come from individuals who are not members. All nominations must be submitted by Sept. 1 to Charles L. Wilkins, Department of Chemistry, University of California, Riverside, Riverside, Calif. 92521-0403.

For further information, contact Philip J. Savickas, Analytical Sciences Laboratory, Dow Chemical Co., 1897F Bldg., Midland, Mich. 48667, phone (517) 636-8728, fax (517) 638-6443. □